What is claimed is:

1. A method for teaching a welding torch orientation for executing an arc welding by a welding torch supported by a robot, said method including the steps of:

transferring existing position data indicating a start point, an end point and junction points between sections on a weld line to the robot controller;

[for each section] inputting a forward angle which is an inclined angle of the welding torch with reference to a [direction of the section] weld line;

obtaining a reference plane by teaching, or selecting any one of planes previously stored in a robot controller as a reference plane, and then inputting [for each section,] an inclination angle which is an inclined angle of the welding torch with respect to the reference plane;

calculating, in software, a desired torch orientation [for the length of each section] based on the data on the respective points transferred to said robot controller, and said inputted inclination angle and said forward angle;

setting auxiliary points in the periphery of the junction point, for each junction point that connects a straightline section with another straight line section; and

allocating the torch orientation, in software, for each of the set auxiliary points and junction points according to the arrangement of the points, so that the torch orientation is changed gradually from said desired torch orientation in the section after the junction point to said desired torch orientation in the section before the junction point.

2. A method for teaching a welding torch orientation for executing the arc welding by a welding torch supported by a robot, said method including the steps of:

teaching the position of a start point, an end point and junction points between sections on a weld line by a robot jog feed operation without imposing a specific condition on the torch orientation;

[for each section] inputting a forward angle which is an inclined angle of the welding torch [to the direction of the section] with reference to a weld line;

obtaining a reference plane by teaching, or selecting any one of planes previously stored in a robot controller as a reference plane, and then inputting[, for each section,] an inclination angle which is an inclined angle of the welding torch with respect to the reference plane;

calculating a desired torch orientation, in software, [for each section] on the basis of the taught data on the respective points, and said inputting inclination angle and said forward angle;

setting auxiliary points in the periphery of a junction point for each junction point that connects a straight-line section with another straight-line section; and

allocating the torch orientation for each of the set auxiliary points and junction points in software, according to the arrangement of the points, so that the torch orientation is changed gradually from said desired torch orientation in the section after the junction point to said desired torch orientation in the section before the junction point.

3. A method for teaching a welding torch orientation as set forth in claim 2, wherein during the calculation of said basic welding orientation, the state at the time of teaching by said jog feed operation is further reflected for the orientation around a torch axis.

4. A method of teaching a welding torch orientation as set forth in claim 1, wherein said reference plane is defined by teaching a required plane to said robot.

5. A method of teaching a weld torch orientation for executing the arc welding by a welding torch supported by a robot, said method comprising the steps of:

(a) teaching position data indicating a start point of a weld line, an end point of the weld line and connection points dividing the weld line into a plurality of straight-line sections;

(b) obtaining a reference plane by teaching or selecting any one of planes already stored in a robot controller;

(c) defining a three-axis rectangular coordinate system for each straight-line section based on a direction of a straight-line section and a normal direction of the reference plane taught or selected in step (b);

(d) transforming a tool vector composed of a set of three rectangular unit vectors, including a torch direction unit vector, to an expression in the three-axis rectangular coordinate system defined in step (c);

(e) calculating a taught inclination angle and a taught forward angle from the tool vector expressed in the three-axis rectangular coordinate system, the inclination angle being defined as an angle of the welding torch with respect to the plane, and the forward angle as an angle of the welding torch with respect to the direction of the section, and then, on the basis of these angles, determining a taught spin angle as a taught orientation with the torch direction taken as an axis;

(f) calculating the tool vector expressed in the three-step rectangular coordinate system determined in step (c), from the taught spin angle obtained in step (e), a forward angle specified by input, and an inclination angle specified by input;

(g) obtaining a basic welding orientation for said straight-line section, by transforming the calculated tool vector obtained in step (f) to an expression in the base coordinate system;

(h) setting at least one auxiliary point spaced apart by a predetermined distance in the straight-line section at least one of before and after a junction point, with the junction point as a reference;

(i) specifying the basic welding orientation for the straight-line section defined in step (g) to an auxiliary point at the position most apart from the junction point in the forward/rearward straight-line section, among auxiliary points set in step (h); and

(j) allocating the torch orientation for any remaining auxiliary points and said junction points according to the arrangement of the points, so that the torch orientation is changed gradually from the basic torch orientation for one straight-line section defined in step (g) to the basic torch orientation for the next straight-line section.

6. A method of teaching a welding torch orientation as set forth in claim 2, wherein said reference plane is defined by teaching a required plane to said robot.

7. A method of teaching a welding torch orientation as set forth in claim 3, wherein said reference plane is defined by teaching a required plane to said robot.